NOTES FOR STUDENTS

Flora of southern Illinois.—In analyzing the elements entering into the flora of the southern portion of the state of Illinois, PALMER[4] distinguishes as the most notable feature the presence of typically southern species which here reach their most northern extension. This southern element he regards not as a recent invasion, but as the remnants of a more numerous aggregation that existed here in the remote past. These species, therefore, are not extending but rather restricting their range. Two floristic formations are distinguished and named the Cairo and Mounds formations, from the towns about which they center. The former dominates the rich soils of the Mississippi and the Ohio River flood plains formerly covered with rich forests. Among the common tree species are *Taxodium distichum, Nyssa aquatica, Gleditsia aquatica, Fraxinus profunda, Liquidambar styraciflua, Quercus lyrata, Betula nigra, Carya laciniosa,* and many others. Among the herbaceous plants may be mentioned *Hottonia inflata, Triadentum petiolatum, Dianthera ovata, Spilanthes americana,* and *Mikania scandens.* The Mounds formation reaches its best development upon some low hills with gentle slopes of Cretaceous age. Its typical trees are less distinctively southern, and include such species as *Carya glabra, Quercus Muhlenbergii, Q. velutina, Q. Schneckii, Liriodendron tulipifera, Cercis canadensis,* and *Acer saccharum.* Upon the lower elevations the trees are large and tall, while upon the poorer soil and greater elevations of the Ozark hills not only is there a decrease in size, but there is a greater predominance of oaks and hickories, such as *Quercus velutina, Q. alba, Q. stellata, Carya glabra, C. ovalis,* and *C. alba.*

The report concludes with a list of woody plants collected. This includes not less than twelve species and varieties of *Carya* and fifteen species and eight hybrids of *Quercus.*—GEO. D. FULLER.

Seasonal changes in carbohydrates—MITRA[5] has recently published a paper on seasonal changes of carbohydrate materials in apple seedlings. Analysis has been made on one- and two-year old stems and roots and on fruit spurs, for the determination of the amount of starch, sucrose, maltose, glucose, and total sugars at intervals of fifteen days during the year. Some determinations of acidity in autumn, winter, and spring have also been made. Starch reaches its maximum amount in one- and two-year old apple stems in October and November, with a secondary increase in June. The same is true of roots. Total carbohydrates show a similar curve, reaching 44 per cent in winter. Total and reducing sugars in one- and two-year old stems and in roots increase in January and March. The author finds an increase in acidity in November,

---

[4] PALMER, E. J., Botanical reconnoissance of southern Illinois. Jour. Arnold Arboretum **2**:129–153. 1921.

[5] MITRA, S. K., Seasonal changes and translocation of carbohydrate materials in fruit spurs and two-year old seedlings of apple. Ohio Jour. Sci. **21**:89–103. 1921.

while the tissue is practically neutral in February and March. He states also that there is a general correlation between acidity of tissues and the relative activity of diastase and maltase as determined from amount of glucose and maltose in tissues. Maltose is most abundant when acidity is high and near the optimum for diastase. Glucose is found to increase in quantity in the late winter at a time when tissues are practically neutral, acidity being near the optimum for maltase activity. An average of eight determinations of maltose made in November, when acidity is highest, is 1.99 per cent, and an average of eight similar determinations made in March, when tissues are practically neutral, shows 1.86 per cent maltose. This difference seems too insignificant to conclude that maltose is present in larger quantities at a time when acidity is highest, especially when maltose determinations vary from 0.46 to 3 or 4 per cent. The only conclusion concerning this, in the reviewer's judgment, is that maltose is always present and in very variable amounts.—JOHN M. ARTHUR.

Ecology of the Gangetic plain.—In a paper of more than usual interest, DUDGEON[6] has included the results of his studies of a region whose ecology has been almost unknown. This part of India, lying immediately about Allahabad, has a distinctly periodic climate, with about 90 cm. of rainfall, and three distinct seasons. The rainy season, from June to the end of September, has high precipitation, high humidity, high temperature, and low insolation; the cold season, from October to the end of February, has high humidity, high insolation, but low rainfall and low temperature (mean 35° F. to 55° F.); the third or hot season, has low rainfall and humidity, but high insolation and temperature (mean 80° F.).

The existing vegetation is shown to be influenced quite as much by the biotic factors of a human population of 530 persons and 470 domestic grazing animals per square mile as by the nature of the climate. Most of the area is covered with dry meadow and thorn scrub, but it seems certain that these associations, now balanced against intense human influence, are really the retrogressive remains of a much richer climatic vegetation. The author seems to have thoroughly established his final conclusion, that "if the retrogressive influence of the biotic (human) factors were removed, the vegetation would pass through the progressively higher forest stages of (1) fully developed thorn scrub, (2) pioneer monsoon deciduous forest, and (3) climatic climax monsoon deciduous forest, a forest of considerable density and luxuriance." This forest, as shown by adjacent regions, would show *Terminalia tomentosa* and *Tectona grandis* as dominant, and would also contain *Sterculia* spp., *Bombax malabaricum*, *Anogeissus latifolia*, *Buchanania latifolia*, *Eugenia jambolana*, and probably *Acacia catchu* and *Shorea robusta*.—GEO. D. FULLER.

---

[6] DUDGEON, WINFIELD, A contribution to the ecology of the upper Gangetic plain. Jour. Ind. Bot. 1:1–29. *figs. 9.* 1920.